

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: NEO-RAY

Report Number: P904249

Luminaire Tested: DFN2DIP-SQ4F0-160D120US830-FLLONL

Issue Date: 11/21/2024

**Test Information**

Test Method: LM-79-2019  
Report Number: P904249  
REPORT IS A COMBINATION OF REPORTS P901703 AND P898471  
Test Lab: INNOVATION CENTER  
Issue Date: 11/21/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: NEO-RAY  
Catalog Number: DFN2DIP-SQ4F0-160D120US830-FLLONL  
Description: 4 foot, Square Define Geo, with Direct Frosted Lens, Indirect Open No Lens  
Light Source: -  
Ballast/Driver: -

**Summary**

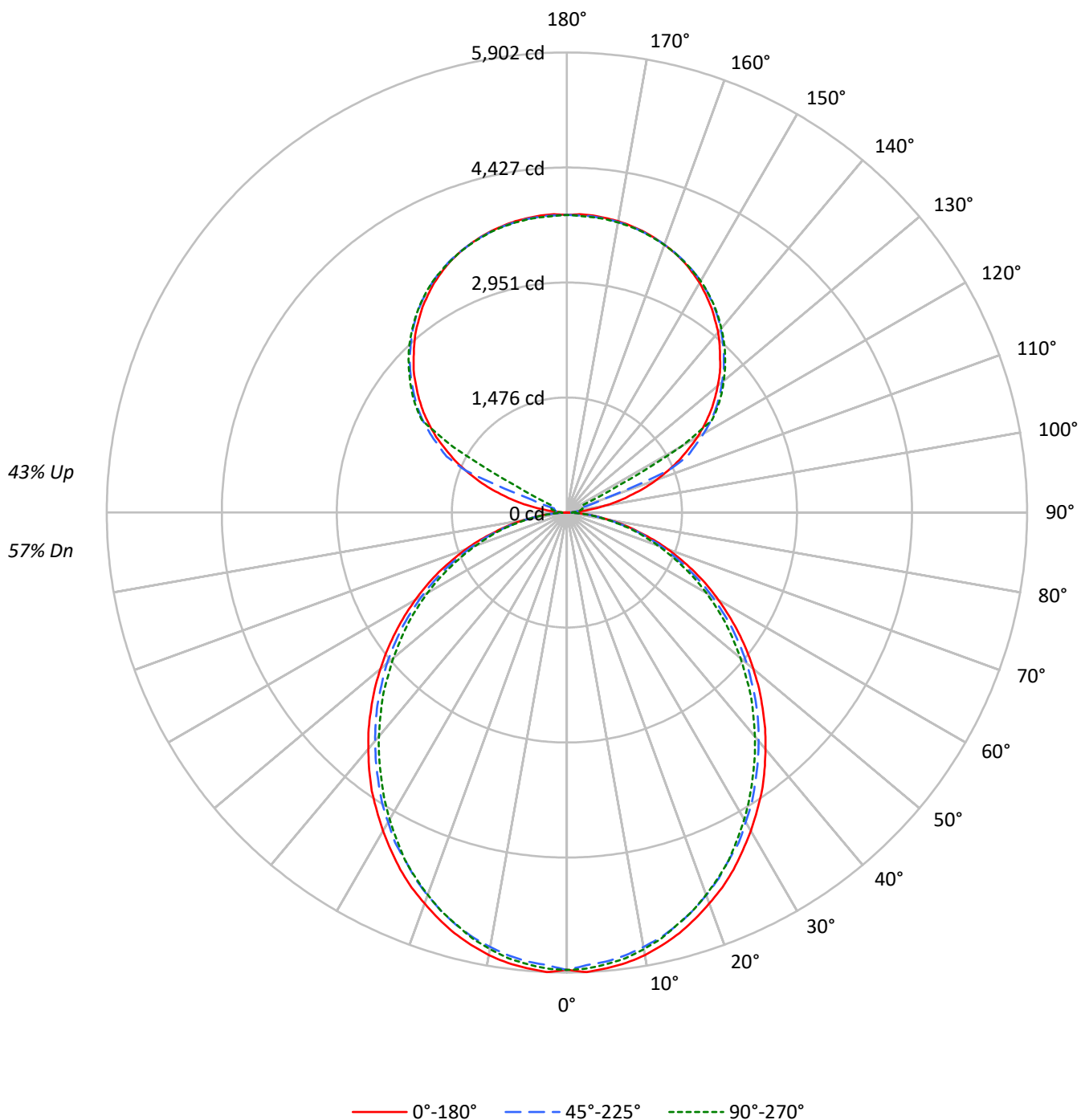
Lumens per Lamp: N/A  
Luminaire Lumens: 26127.2 lumens  
Efficiency: N/A  
Efficacy: 101.7 lumens/watt  
Spacing Criteria (0/90/45): 1.2 / 1.16 / 1.29  
Luminous Opening: Rectangular w/ Sides (W: 3.92' x L: 3.92' x H: 0.1')  
CIE Type: General Diffuse

Input Watts (W): 256.8  
Input Voltage (V):  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.9971  
Total Harmonic Distortion (THDi): 0.049  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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### Luminous Intensity Polar Plot



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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|
| RF  | 20  |     |     |     | 20  |     |     |     | 20 |    |    |    | 20 |    |    |    | 20 |
| RC  | 80  |     |     |     | 70  |     |     |     | 50 |    |    |    | 30 |    |    |    | 10 |
| RW  | 70  | 50  | 30  | 10  | 70  | 50  | 30  | 10  | 50 | 30 | 10 | 50 | 30 | 10 | 50 | 30 | 10 |
| RCR |     |     |     |     |     |     |     |     |    |    |    |    |    |    |    |    |    |
| 0   | 109 | 109 | 109 | 109 | 101 | 101 | 101 | 101 | 87 | 87 | 87 | 74 | 74 | 74 | 63 | 63 | 63 |
| 1   | 99  | 95  | 91  | 88  | 92  | 89  | 85  | 82  | 77 | 74 | 72 | 66 | 64 | 62 | 55 | 54 | 53 |
| 2   | 91  | 83  | 77  | 72  | 84  | 77  | 72  | 67  | 67 | 63 | 59 | 58 | 55 | 52 | 49 | 47 | 45 |
| 3   | 83  | 73  | 66  | 60  | 77  | 68  | 62  | 56  | 59 | 54 | 50 | 51 | 47 | 44 | 43 | 40 | 38 |
| 4   | 76  | 65  | 57  | 50  | 70  | 61  | 53  | 48  | 53 | 47 | 43 | 45 | 41 | 38 | 39 | 35 | 33 |
| 5   | 69  | 58  | 49  | 43  | 64  | 54  | 47  | 41  | 47 | 41 | 37 | 41 | 36 | 33 | 35 | 31 | 29 |
| 6   | 64  | 52  | 44  | 38  | 59  | 49  | 41  | 36  | 43 | 37 | 32 | 37 | 32 | 29 | 32 | 28 | 25 |
| 7   | 59  | 47  | 39  | 33  | 55  | 44  | 37  | 32  | 39 | 33 | 28 | 34 | 29 | 25 | 29 | 25 | 22 |
| 8   | 55  | 43  | 35  | 29  | 51  | 40  | 33  | 28  | 35 | 29 | 25 | 31 | 26 | 23 | 27 | 23 | 20 |
| 9   | 51  | 39  | 31  | 26  | 48  | 37  | 30  | 25  | 32 | 27 | 23 | 28 | 24 | 20 | 25 | 21 | 18 |
| 10  | 48  | 36  | 28  | 24  | 45  | 34  | 27  | 22  | 30 | 24 | 20 | 26 | 22 | 18 | 23 | 19 | 17 |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°   | 45°  | 90°  |
|-----|------|------|------|
| 0°  | 4117 | 4117 | 4117 |
| 5°  | 4124 | 4061 | 4089 |
| 10° | 4090 | 4007 | 4034 |
| 15° | 4030 | 3942 | 3949 |
| 20° | 3949 | 3851 | 3862 |
| 25° | 3868 | 3742 | 3760 |
| 30° | 3767 | 3641 | 3631 |
| 35° | 3671 | 3521 | 3495 |
| 40° | 3552 | 3401 | 3365 |
| 45° | 3434 | 3280 | 3232 |
| 50° | 3305 | 3153 | 3078 |
| 55° | 3171 | 3007 | 2937 |
| 60° | 3018 | 2832 | 2776 |
| 65° | 2852 | 2652 | 2585 |
| 70° | 2640 | 2432 | 2380 |
| 75° | 2346 | 2170 | 2193 |
| 80° | 1993 | 1835 | 1832 |
| 85° | 1440 | 1255 | 1231 |

**MAXIMUM LUMINANCE 45°-90°:**

Horizontal Angle: 0°

Vertical Angle: 45°

Luminance: 3434 cd/sqm

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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 552.3   | 2.1       |
| 10°-20°   | 1553.9  | 5.9       |
| 20°-30°   | 2283.7  | 8.7       |
| 30°-40°   | 2652.4  | 10.2      |
| 40°-50°   | 2649.1  | 10.1      |
| 50°-60°   | 2309.9  | 8.8       |
| 60°-70°   | 1707.5  | 6.5       |
| 70°-80°   | 966.1   | 3.7       |
| 80°-90°   | 261.7   | 1.0       |
| 90°-100°  | 125.9   | 0.5       |
| 100°-110° | 469.2   | 1.8       |
| 110°-120° | 1244.4  | 4.8       |
| 120°-130° | 2064.0  | 7.9       |
| 130°-140° | 2192.4  | 8.4       |
| 140°-150° | 2037.6  | 7.8       |
| 150°-160° | 1638.2  | 6.3       |
| 160°-170° | 1055.6  | 4.0       |
| 170°-180° | 363.3   | 1.4       |
| 0°-30°    | 4389.9  | 16.8      |
| 0°-40°    | 7042.3  | 27.0      |
| 0°-60°    | 12001.3 | 45.9      |
| 0°-90°    | 14936.6 | 57.2      |
| 90°-120°  | 1839.5  | 7.0       |
| 90°-150°  | 8133.6  | 31.1      |
| 90°-180°  | 11191.0 | 42.8      |
| 0°-180°   | 26127.2 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 5868 | 5868  | 5868 | 5868  | 5868 |      |
| 5°   | 5868 | 5846  | 5784 | 5828  | 5818 | 557  |
| 15°  | 5586 | 5552  | 5479 | 5502  | 5473 | 1573 |
| 25°  | 5056 | 5011  | 4915 | 4926  | 4915 | 2326 |
| 35°  | 4362 | 4306  | 4215 | 4181  | 4153 | 2724 |
| 45°  | 3549 | 3510  | 3425 | 3363  | 3340 | 2739 |
| 55°  | 2686 | 2652  | 2584 | 2517  | 2489 | 2402 |
| 65°  | 1812 | 1777  | 1721 | 1670  | 1642 | 1791 |
| 75°  | 948  | 937   | 908  | 875   | 886  | 1012 |
| 85°  | 231  | 226   | 220  | 203   | 198  | 258  |
| 90°  | 3    | 33    | 55   | 69    | 74   | 24   |
| 95°  | 179  | 88    | 108  | 122   | 119  | 212  |
| 105° | 840  | 923   | 169  | 199   | 210  | 897  |
| 115° | 1588 | 1635  | 1704 | 425   | 227  | 1563 |
| 125° | 2245 | 2282  | 2334 | 2353  | 2362 | 2003 |
| 135° | 2779 | 2823  | 2848 | 2876  | 2870 | 2146 |
| 145° | 3224 | 3221  | 3267 | 3287  | 3273 | 2016 |
| 155° | 3549 | 3524  | 3558 | 3574  | 3552 | 1635 |
| 165° | 3740 | 3723  | 3732 | 3751  | 3732 | 1057 |
| 175° | 3825 | 3806  | 3812 | 3831  | 3803 | 364  |
| 180° | 3817 | 3817  | 3817 | 3817  | 3817 |      |

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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 5868.0 | 5868.0 | 5868.0 | 5868.0 | 5868.0 |
| 2.5°   | 5902.1 | 5873.9 | 5811.7 | 5868.0 | 5857.1 |
| 5°     | 5868.0 | 5845.8 | 5783.5 | 5828.5 | 5817.7 |
| 7.5°   | 5828.5 | 5794.9 | 5732.6 | 5778.2 | 5766.8 |
| 10°    | 5766.8 | 5727.3 | 5659.7 | 5704.5 | 5687.8 |
| 12.5°  | 5681.8 | 5648.3 | 5580.6 | 5608.8 | 5597.4 |
| 15°    | 5586.0 | 5552.5 | 5478.8 | 5501.6 | 5473.4 |
| 17.5°  | 5467.5 | 5433.9 | 5360.3 | 5388.4 | 5360.3 |
| 20°    | 5337.5 | 5304.1 | 5225.0 | 5241.8 | 5219.6 |
| 22.5°  | 5208.3 | 5157.4 | 5083.7 | 5083.7 | 5072.4 |
| 25°    | 5055.6 | 5010.7 | 4914.9 | 4925.7 | 4914.9 |
| 27.5°  | 4886.1 | 4846.6 | 4773.6 | 4756.9 | 4728.7 |
| 30°    | 4717.3 | 4671.9 | 4587.4 | 4570.7 | 4548.0 |
| 32.5°  | 4536.6 | 4503.1 | 4412.6 | 4378.5 | 4355.8 |
| 35°    | 4361.8 | 4305.5 | 4215.0 | 4180.9 | 4152.8 |
| 37.5°  | 4164.2 | 4113.3 | 4023.0 | 3983.4 | 3955.3 |
| 40°    | 3961.2 | 3915.8 | 3825.4 | 3775.1 | 3752.4 |
| 42.5°  | 3763.8 | 3718.2 | 3628.4 | 3571.6 | 3538.0 |
| 45°    | 3549.4 | 3509.8 | 3424.9 | 3363.2 | 3340.5 |
| 47.5°  | 3340.5 | 3301.0 | 3210.6 | 3148.3 | 3114.8 |
| 50°    | 3120.2 | 3092.0 | 3013.0 | 2933.9 | 2905.9 |
| 52.5°  | 2905.9 | 2866.4 | 2793.3 | 2731.0 | 2691.5 |
| 55°    | 2686.2 | 2652.0 | 2584.4 | 2516.7 | 2488.6 |
| 57.5°  | 2465.9 | 2437.7 | 2364.1 | 2296.4 | 2273.7 |
| 60°    | 2245.5 | 2223.4 | 2144.4 | 2082.1 | 2065.3 |
| 62.5°  | 2031.2 | 1991.7 | 1935.4 | 1879.1 | 1856.4 |
| 65°    | 1811.5 | 1777.4 | 1721.1 | 1670.3 | 1642.1 |
| 67.5°  | 1585.8 | 1557.1 | 1506.8 | 1467.3 | 1444.5 |
| 70°    | 1376.9 | 1354.2 | 1303.3 | 1263.8 | 1241.6 |
| 72.5°  | 1162.5 | 1139.8 | 1111.7 | 1072.1 | 1055.5 |
| 75°    | 947.6  | 936.9  | 908.1  | 874.6  | 886.0  |
| 77.5°  | 756.1  | 733.4  | 722.0  | 705.2  | 688.4  |
| 80°    | 564.5  | 558.6  | 547.1  | 530.4  | 519.1  |
| 82.5°  | 383.7  | 383.7  | 378.3  | 355.6  | 355.6  |
| 85°    | 231.1  | 225.6  | 220.3  | 202.9  | 197.6  |
| 87.5°  | 101.8  | 90.4   | 79.0   | 62.3   | 56.3   |
| 90°    | 2.6    | 33.1   | 55.1   | 69.2   | 74.5   |
| 92.5°  | 69.2   | 58.1   | 66.3   | 71.8   | 74.5   |
| 95°    | 179.4  | 88.2   | 107.5  | 121.7  | 118.8  |
| 97.5°  | 323.1  | 96.8   | 140.7  | 149.2  | 151.8  |
| 100°   | 489.0  | 110.6  | 157.4  | 179.4  | 185.0  |
| 102.5° | 671.1  | 665.8  | 163.0  | 193.2  | 201.7  |
| 105°   | 839.6  | 922.7  | 168.6  | 198.8  | 209.9  |
| 107.5° | 1035.8 | 1104.7 | 174.2  | 204.3  | 215.5  |
| 110°   | 1223.7 | 1281.5 | 483.4  | 207.3  | 218.1  |

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**CANDELA DISTRIBUTION (continued):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 112.5° | 1400.5 | 1450.0 | 1403.2 | 212.5  | 221.0  |
| 115°   | 1588.1 | 1635.0 | 1704.2 | 425.4  | 226.7  |
| 117.5° | 1751.1 | 1806.3 | 1853.5 | 1458.2 | 734.7  |
| 120°   | 1933.5 | 1974.8 | 2024.7 | 2057.9 | 1684.9 |
| 122.5° | 2088.0 | 2132.3 | 2187.7 | 2204.1 | 2207.1 |
| 125°   | 2245.4 | 2281.5 | 2334.0 | 2353.3 | 2361.5 |
| 127.5° | 2389.1 | 2427.8 | 2469.5 | 2497.0 | 2499.6 |
| 130°   | 2524.5 | 2568.8 | 2599.0 | 2629.5 | 2626.9 |
| 132.5° | 2662.6 | 2698.7 | 2728.8 | 2753.8 | 2751.2 |
| 135°   | 2778.7 | 2823.0 | 2847.6 | 2875.5 | 2869.9 |
| 137.5° | 2900.1 | 2933.2 | 2961.1 | 2988.6 | 2980.4 |
| 140°   | 3018.9 | 3041.1 | 3071.3 | 3096.3 | 3082.5 |
| 142.5° | 3118.5 | 3137.9 | 3173.6 | 3195.6 | 3181.8 |
| 145°   | 3223.5 | 3220.6 | 3267.4 | 3286.8 | 3273.0 |
| 147.5° | 3314.4 | 3306.2 | 3353.1 | 3366.9 | 3356.0 |
| 150°   | 3402.9 | 3383.5 | 3427.8 | 3444.2 | 3430.5 |
| 152.5° | 3477.3 | 3455.4 | 3496.7 | 3513.4 | 3494.1 |
| 155°   | 3549.1 | 3524.5 | 3557.7 | 3574.1 | 3552.2 |
| 157.5° | 3607.2 | 3585.2 | 3610.2 | 3629.5 | 3607.2 |
| 160°   | 3657.1 | 3640.4 | 3657.1 | 3673.5 | 3654.1 |
| 162.5° | 3701.1 | 3684.7 | 3698.4 | 3717.8 | 3692.9 |
| 165°   | 3739.7 | 3723.3 | 3731.5 | 3750.9 | 3731.5 |
| 167.5° | 3770.3 | 3753.5 | 3762.1 | 3781.4 | 3756.5 |
| 170°   | 3795.1 | 3778.5 | 3784.0 | 3803.3 | 3778.5 |
| 172.5° | 3811.5 | 3795.1 | 3800.8 | 3820.1 | 3795.1 |
| 175°   | 3825.3 | 3806.0 | 3811.5 | 3831.0 | 3803.3 |
| 177.5° | 3831.0 | 3811.5 | 3814.6 | 3833.9 | 3809.0 |
| 180°   | 3817.2 | 3817.2 | 3817.2 | 3817.2 | 3817.2 |

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**CIE UGR TABLE:**

| Reflectances:   |      |                  |       |       |       |       |                |       |       |       |       |
|-----------------|------|------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|
| Ceiling         |      | 0.7              | 0.7   | 0.5   | 0.5   | 0.3   | 0.7            | 0.7   | 0.5   | 0.5   | 0.3   |
| Wall            |      | 0.5              | 0.3   | 0.5   | 0.3   | 0.3   | 0.5            | 0.3   | 0.5   | 0.3   | 0.3   |
| Reference plane |      | 0.2              | 0.2   | 0.2   | 0.2   | 0.2   | 0.2            | 0.2   | 0.2   | 0.2   | 0.2   |
| Room dimensions |      | Viewed crosswise |       |       |       |       | Viewed endwise |       |       |       |       |
| X=2H            | Y=2H | 12.84            | 13.77 | 13.73 | 14.68 | 15.85 | 12.39          | 13.32 | 13.29 | 14.24 | 15.40 |
|                 | 3H   | 14.51            | 15.34 | 15.41 | 16.26 | 17.45 | 14.02          | 14.85 | 14.92 | 15.77 | 16.96 |
|                 | 4H   | 15.10            | 15.89 | 16.02 | 16.82 | 18.02 | 14.61          | 15.40 | 15.53 | 16.32 | 17.52 |
|                 | 6H   | 15.51            | 16.24 | 16.44 | 17.17 | 18.38 | 15.01          | 15.74 | 15.94 | 16.67 | 17.88 |
|                 | 8H   | 15.62            | 16.31 | 16.56 | 17.26 | 18.47 | 15.12          | 15.81 | 16.05 | 16.76 | 17.97 |
|                 | 12H  | 15.67            | 16.33 | 16.61 | 17.27 | 18.51 | 15.16          | 15.82 | 16.10 | 16.76 | 18.00 |
| 4H              | 2H   | 13.31            | 14.10 | 14.23 | 15.02 | 16.22 | 12.95          | 13.74 | 13.88 | 14.67 | 15.87 |
|                 | 3H   | 15.19            | 15.84 | 16.12 | 16.80 | 18.02 | 14.78          | 15.44 | 15.71 | 16.39 | 17.61 |
|                 | 4H   | 15.91            | 16.51 | 16.85 | 17.46 | 18.70 | 15.48          | 16.08 | 16.43 | 17.04 | 18.27 |
|                 | 6H   | 16.43            | 16.95 | 17.39 | 17.92 | 19.16 | 16.00          | 16.52 | 16.96 | 17.49 | 18.73 |
|                 | 8H   | 16.58            | 17.07 | 17.54 | 18.04 | 19.29 | 16.14          | 16.63 | 17.11 | 17.60 | 18.85 |
|                 | 12H  | 16.66            | 17.10 | 17.64 | 18.09 | 19.34 | 16.21          | 16.65 | 17.19 | 17.64 | 18.89 |
| 8H              | 4H   | 16.11            | 16.59 | 17.07 | 17.56 | 18.82 | 15.73          | 16.22 | 16.69 | 17.19 | 18.44 |
|                 | 6H   | 16.75            | 17.15 | 17.73 | 18.16 | 19.41 | 16.36          | 16.76 | 17.35 | 17.78 | 19.03 |
|                 | 8H   | 16.97            | 17.33 | 17.97 | 18.33 | 19.60 | 16.58          | 16.93 | 17.57 | 17.93 | 19.20 |
|                 | 12H  | 17.11            | 17.42 | 18.11 | 18.42 | 19.73 | 16.70          | 17.01 | 17.70 | 18.00 | 19.32 |
| 12H             | 4H   | 16.10            | 16.53 | 17.08 | 17.52 | 18.78 | 15.73          | 16.17 | 16.71 | 17.15 | 18.41 |
|                 | 6H   | 16.78            | 17.13 | 17.77 | 18.13 | 19.40 | 16.41          | 16.76 | 17.40 | 17.76 | 19.03 |
|                 | 8H   | 17.03            | 17.34 | 18.03 | 18.33 | 19.65 | 16.65          | 16.96 | 17.65 | 17.95 | 19.27 |